A-2

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Attorney Docket No. P51375

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Behrens, *et al.* 14 April 2005
Int'l Serial No.: PCT/US03/28654 Art Unit: unknown
Int'l Filing Date: 12 September 2003 Examiner: unknown
For: A SET OF UBIQUITOUS CELLULAR PROTEINS INVOLVED IN VIRAL LIFE CYCLE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

STATUS INQUIRY

Sirs:

Applicants spoke with Diana of the PCT Help Desk on 14 April 2005. Diana was unable to retrieve any record of submission by international application number or attorney docket number. Enclosed, please find a copy of the submission to the USPTO filed 11 March 2005, the return express mail receipt, and the returned post card date stamped by the PCT/PTO.

Applicants have received no further correspondence or communications from the Commissioner of Patents concerning this case.

Applicant requests the current status of the application.

Respectfully submitted,

Jason C. Fedon
Agent for Applicants
Registration No. 48,138

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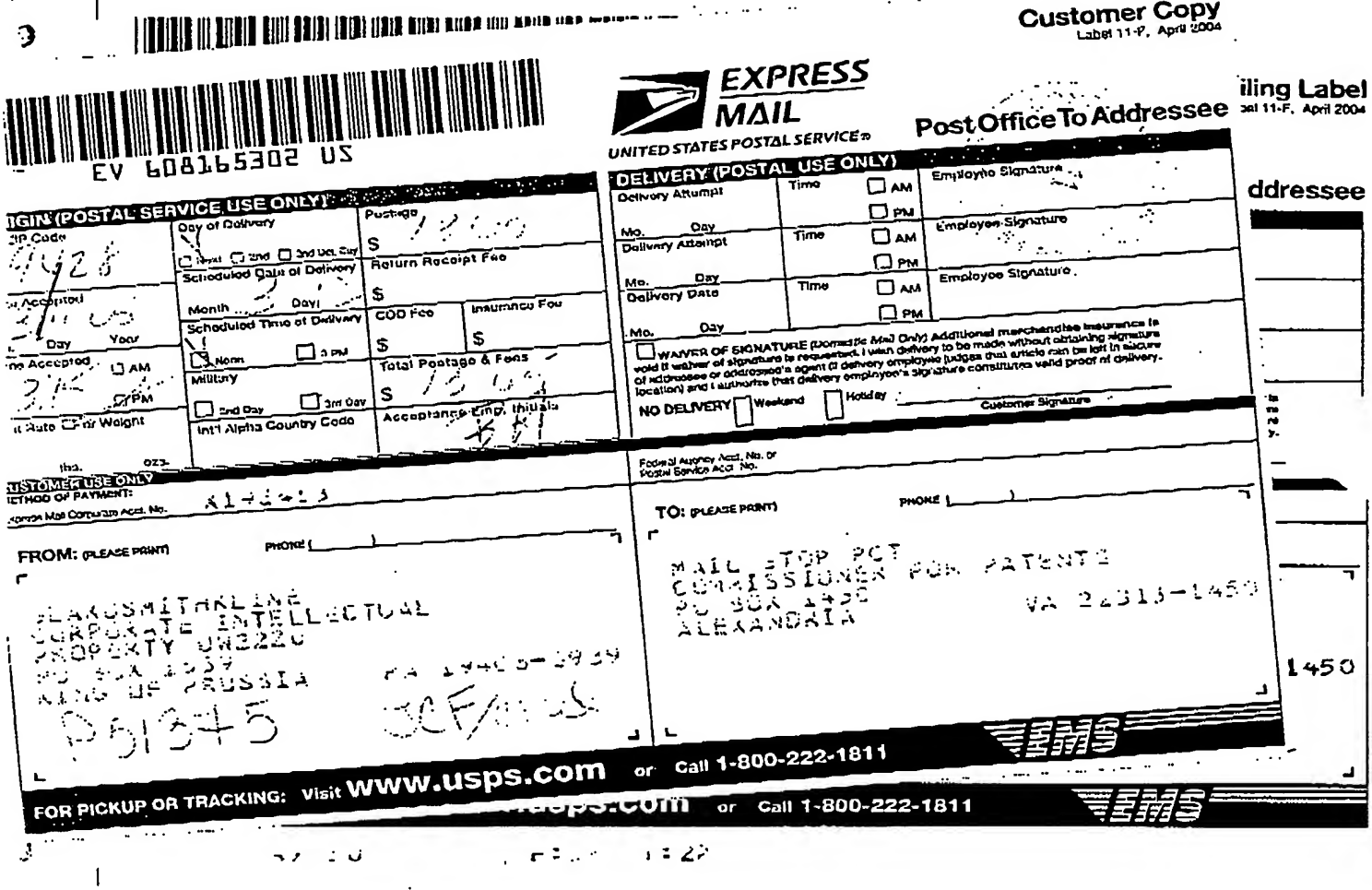

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DOCKET No. P51375 Date Mailed 11 Mar 05 Atty/Secy JCF/mcb

MAILING: ~~CERTIFICATE~~ EXPRESS MAIL # EV608165302US

U.S. Serial No. unknown Filing Date: herewith

Int'l App. No. PCT/US03/28654 Int'l Filing Date: 12 Sept. 03

RECEIPT IS ~~ACK~~NOWLEDGED FOR THE FOLLOWING:

- ☐ Appln. Trans. (+ 1 copy) for: ☐ Provisional ☐ CIP ☒ Statement to Support Filing
- ☐ Utility/Continuation ☐ CPA ☐ RCE ☐ Divisional ☐ Copy of Notice to Comply
- ☐ Specification ____ pages ☒ Abstract 1 pg ☒ Diskette ☒ Paper Seq.Listing
- ☐ Dec. & Power of Atty ___ pages ( )
- ☐ Drawings ____ Sheet(s)/Figs ____ to ____
- ☐ Assignment ___ pages & Recordation Cover Sheet
- ☒ Trans. Ltr Natl Stage Entry (3pgs.)
- ☐ Information Disclosure Statement
- ☐ Form PTO-1449 ___ pgs. & ____ References
- ☒ Amendment ☐ Response 60 pages
- ☐ Petition for Extension of Time
- ☐ Issue Fee Trans. (Part B) + 1 copy
- ☐ Copy of Notice to File Missing Parts
- ☐ Request for Nonpublication (1 pg)
- ☒ Authorization to Charge Dep. Acct. # 19-2570
- ☐ _____

- ☐ Appeal Brief ____ pages
- ☐ Petition ___ pgs.
- ☐ Status Request
- ☐ Trans. Nat'l Stage (2nd sub)
- ☐ Resp. to Written Opinion
- ☐ Priority Document
- ☐ Notice of Appeal/Brief
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- ☐ Req. to Correct Filing Receipt
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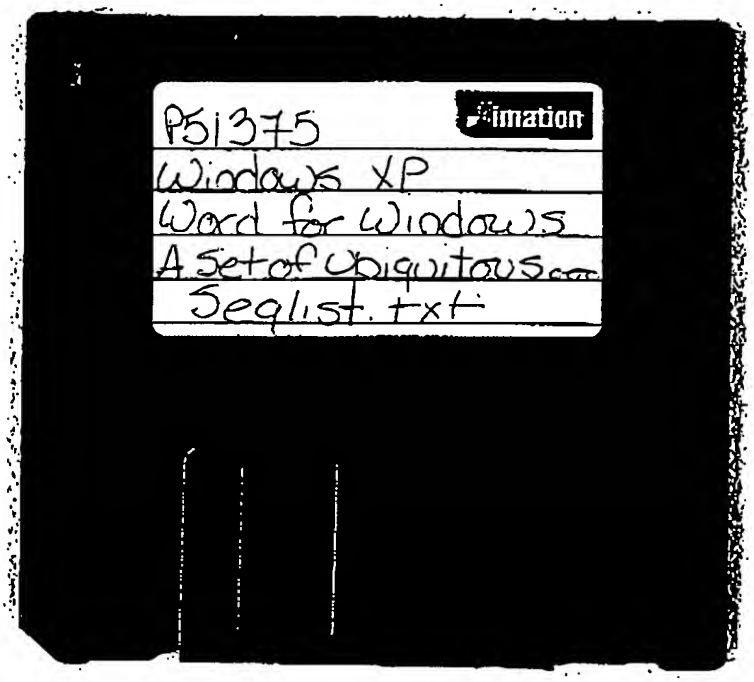
DT02 Rec'd PCT/PTO 11 MAR 2005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P51375
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"EXPRESS MAIL CERTIFICATE"
"EXPRESS MAIL" MAILING LABEL NUMBER EV608165302US
DATE OF DEPOSIT 11 March 2005
I HEREBY CERTIFY THAT THIS PAPER OR FEE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE "EXPRESS MAIL POST OFFICE TO ADDRESSEE" SERVICE UNDER 37 CFR 1.10 ON THE DATE INDICATED ABOVE AND IS ADDRESSED TO COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450.
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(TYPE OR PRINT) Christina Davis

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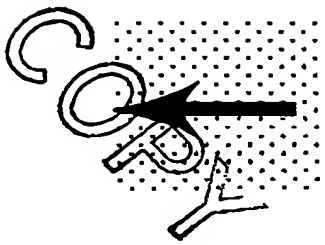

Attorney Docket No.: P51375

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Behrens, et al. 11 March 2005

International Serial No.: PCT/US03/28654 Group Art Unit No.: unknown

International Filing Date: 12 September 2003 Examiner: unassigned

For: A Set Of Ubiquitous Cellular Protiens Involved In Viral Life Cycle

STATEMENT TO SUPPORT FILING AND SUBMISSION IN ACCORDANCE WITH 37 CFR §§ 1.821 THROUGH 1.825

Commissioner for Patents
Mail Stop: PCT
P.O. Box 1450
Alexandria, Va 22313-1450

(X) I hereby state that the contents of the paper and computer readable copies of the Sequence Listing, submitted in accordance with **37 CFR §1.821(c)** and **(e)**, respectively, are the same.

( ) I hereby state that the submission filed in accordance with **37 CFR §1.821 (g)** does not include new matter.

( ) I hereby state that the submission filed in accordance with **37 CFR §1.821 (h)** does not include new matter or go beyond the disclosure in the international application as filed.

( ) I hereby state that the amendments, made in accordance with **37 CFR §1.825 (a)**, included in the substitute sheet(s) of the Sequence Listing are supported in the application, as filed, at pages _____. I hereby state that the substitute sheet(s) of the Sequence Listing does (do) not include new matter.

( ) I hereby state that the substitute copy of the computer readable form, submitted in accordance with **37 CFR §1.825(b)**, is the same as the amended Sequence Listing.

Serial No.: PCT/US0 3654
Group Art Unit No.: unknown

( ) I hereby state that the substitute copy of the computer readable form, submitted in accordance with **37 CFR §1.825(d)**, is identical to that originally filed.

Respectfully submitted,

Jason C. Fedon

Jason C. Fedon
Agent for Applicants
Registration No. 48,138

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PATENT
ATTORNEY'S DOCKET NUMBER P51375

TRANSMITTAL LETTER TO THE U.S. DESIGNATED OFFICE (DO/US) - ENTRY INTO NATIONAL STAGE UNDER 35 USC 371

INTERNATIONAL APP. NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/US03/28654	12 September 2003	13 September 2002

TITLE OF INVENTION
A SET OF UBIQUITOUS CELLULAR PROTIENS INVOLVED IN VIRAL LIFE CYCLE

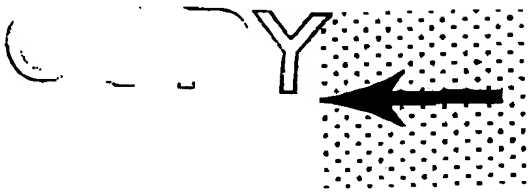
APPLICANT(S) FOR DO/US
Sven-Erik BEHRENS, Olaf ISKEN, Claus W. GRASSMANN, and Robert T. SARISKY

Commissioner for Patents
Mail Stop: PCT
P.O. Box 1450
Alexandria, VA 22313-1450
ATTENTION: DO/US

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this Transmittal Letter, Form PTO 1390 and the papers indicated as being transmitted therewith, and Post Card are being deposited with the United States Postal Service on this date **March 11, 2005** in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number **EV608165302US** addressed to the:
Commissioner for Patents, Mail Stop: PCT, P.O. Box 1450, Alexandria, VA 22313-1450.

Christina A. Daigle
(Typed or printed name of person mailing paper)



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Form PTO 1390 (REV 5-93) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER P51375
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED / ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)
INTERNATIONAL APPLICATION NO. PCT/US03/28654	INTERNATIONAL FILING DATE 12 September 2003	PRIORITY DATE CLAIMED 13 September 2002
TITLE OF INVENTION A SET OF UBIQUITOUS CELLULAR PROTIENS INVOLVED IN VIRAL LIFE CYCLE		
APPLICANT(S) FOR DO/EO/US Sven-Erik BEHRENS, Olaf ISKEN, Claus W. GRASSMANN, and Robert T. SARISKY		

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1 [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. [X] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).

4. [X] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [ ] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [X] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).

6. [ ] A translation of the International Application into English (35 U.S.C. 371(c)(2)).

7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.

8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S. C. 371(c)(3)).

9. [ ] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; and Form PTO-1449.

12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.

13. [X] A **FIRST** preliminary amendment.
(Add claim to priority via Preliminary Amendment for US originating cases only)

14. [ ] A SECOND or SUBSEQUENT preliminary amendment.

15. [ ] A substitute specification.

16. [ ] Power of attorney.

17. [x] An Abstract on a separate sheet of paper.

18. [ ] Copy of Form PCT/ISA/210.

19. [ ] Other items or information.

US APPLICATION NO. (if known see 37 CFR 1.50)	INTERNATIONAL APPLICATION NO. PCT/US03/28654	ATTORNEYS DOCKET NO. P51375

20. [X] The following fees are submitted:	CALCULATION	PTO USE ONLY
Basic National Fee (37 C.F.R. 1.492(a)(1)-(5)):		
☒ Basic Filing Fee.....$300.00	**$300.00**	
☒ Examination Fee *If International Preliminary Examination Report prepared by USPTO and all claims satisfy provisions of PCTArtlice33(1)-(4).....$100.00 *All other situations.....$200.00	**$200.00**	
☒ Search Fee *Search Fee (37 CFR 1.445(a)(2) has been paid on the international application to the USPTO as an International Searching Authority.....$100.00 *Internationl Search Report prepared and provided to the Office.....$400.00 *All other situations.....$500.00	**$500.00**	
TOTAL OF ABOVE CALCULATIONS =	**$1000.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	**$0.00**	

Claims	Number Filed	Number Extra	Rate		
Total claims	19 - 20 =	0	0 x $50.00	**$0.00**	
Independent claims	2- 3 =	0	0x $200.00	**$0.00**	
Multiple dependent claims (if applicable)			+ $360.00	**$0.00**	
TOTAL OF ABOVE CALCULATIONS =				**$0.00**	
National Stage Application size fee - for each additional 50 sheets that exceed 100 sheets. No. of 50 addt'l sheets 1 x $250.00 =				**$0.00**	
SUBTOTAL =				**$1000.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)) +				$	
TOTAL NATIONAL FEE =				**$1000.00**	
				Amount to be refunded	$
				charged	$

a. ☐ A check in the amount of $____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 19-2570 in the amount of **$1000.00** to cover the above fees.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-2570.

d. ☒ General Authorization to charge any and all fees under 37 CFR 1.16 or 1.17, including petitions for extension of time relating to this application (37 CFR 1.136 (a)(3)).

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
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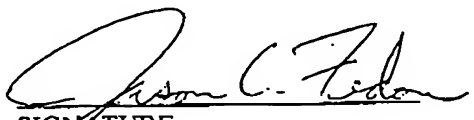

SIGNATURE
Jason C. Fedon
NAME
48,138
REGISTRATION NO.

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Date of Deposit: 11 March 2005

Attorney Docket No: P51375

IN THE UNITED STATES INTERNATIONAL EXAMINING AUTHORITY

International Application No.:	PCT/US03/28654
International Filing Date:	12 September 2003
Priority Date Claimed:	13 September 2002
Applicants for DO/US:	Sven-Erik BEHRENS, Olaf ISKEN, Claus W. GRASSMANN, and Robert T. SARISKY
Title of Invention:	A SET OF UBIQUITOUS CELLULAR PROTIENS INVOLVED IN VIRAL LIFE CYCLE

Commissioner for Patents
Mail Stop: PCT
P.O. Box 1450
Alexandria, VA 22313-1450

FIRST PRELIMINARY AMENDMENT

Sir:

Preliminary to calculating filing fees and examining this application please amend the application as follows.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims begin on page 3 of this paper.

Remarks/Arguments begin on page 6 of this paper.

Amendments to the Specification

Please add the priority information paragraph to the specification by inserting the following new paragraph before the first line of the specification:

This application claims the benefit of U.S. Provisional Application No. 60/410,460, filed 13 September 2002.

An Abstract on a separate sheet is attached as required under 37 CFR 1.72(b). Please insert the attached abstract, following the claims.

International Application No. PCT/US03/28654
International Filing Date: 12 September 2003

Amendments to the claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A method for modulating viral RNA replication and translation, in a eukaryotic cell, of positive-strand viral RNA, comprising the step of contacting a viral RNA-binding protein (vRbp) with a compound that modulates an activity of said vRbp.

2. (Original) The method of claim 1, wherein said vRbp is selected from the group consisting of: vRbp130, vRbp120, vRbp110, vRbp84, vRbp64, and vRbp45.

3. (Original) The method of claim 1 wherein said activity of the vRbp is selected from the group consisting of:

a response to viral RNA,
a response to interferon induction,
a response to double-stranded RNA-dependent protein kinase (PKR), and
a response to vRbp.

4. (Original) The method of claim 3 wherein said response is formation of a viral:cellular ribonucleoprotein (RNP) complex.

5. (Original) The method of claim 4 wherein said RNP complex comprises a viral RNA:vRbp interaction.

6. (Original) The method of claim 5 wherein said viral RNA:vRbp interaction comprises binding of a vRbp to a viral RNA 3' untranslated region (3'UTR).

7. (Original) The method of claim 4 wherein said viral RNA:vRbp interaction comprises binding of a vRbp to a viral RNA 5' untranslated region (5'UTR).

8. (Original) The method of claim 5 wherein said 3'UTR is a UGA box consensus sequence.

9. (Original) The method of claim 3 wherein said response is viral circularization.

10. (Original) The method of claim 9 wherein said viral circularization comprises binding of vRbp to the viral 5'UTR and 3'UTR creating a physical and functional link between both ends of the RNA.

11. (Original) The method of claim 9 wherein said viral circularization comprises an interaction between viral 5'UTR, 3'UTR RNA, vRbp, and cellular proteins involved in the interferon antiviral response.

12. (Original) The method of claim 3 wherein said response is increase in translational frameshifting that result in decreased viral replication.

13. (Original) The method of claim 3 wherein said response is formation of a vRbp:PKR interaction.

14. (Original) The method of claim 1 wherein said viral replication and translation comprises coordinated regulation of replication and translation of viral RNA.

15. (Original) The method of claim 1, wherein said eukaryotic cell is a mammalian cell.

16-17. (Cancelled)

18. (Original) The method of claim 1, wherein said positive strand viral RNA comprises RNA from a member of the family *Flaviviridae.*

19. (Original) The method of claim 1 wherein said positive strand viral RNA comprises RNA from a member of the family *Picornaviridae.*

20-40. (Cancelled)

41. (Original) A method for modulating the function of a viral 3'UTR comprising the step of contacting a 3'UTR with a compound that modulates the structure of the 3'UTR as to inhibit the interaction between 3'UTR and vRbp.

42. (Original) A method for screening to identify compounds that activate or that inhibit the function of vRbp which comprises a method selected from the group consisting of:

(a) mixing a candidate compound with a solution containing a vRbp, to form a mixture, measuring activity of the vRbp in the mixture, and comparing the activity of the mixture to a standard;

(b) detecting the effect of a candidate compound on the production of viral RNA in a eukaryotic cell, using for instance, an ELISA assay, reticulocyte lysate translation assay (luciferase RNA); and

(c) (1) contacting a composition comprising the vRbp with the compound to be screened under conditions to permit interaction between the compound and the vRbp to assess the interaction of a compound, such interaction being associated with a second component capable of providing a detectable signal in response to the interaction of the vRbp with the compound; and

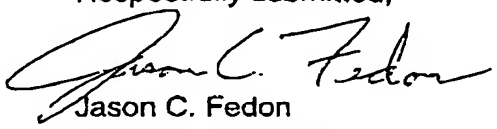
(2) determining whether the compound interacts with and activates or inhibits an activity of the vRbp by detecting the presence or absence of a signal generated from the interaction of the compound with the vRbp.

43-46. (Cancelled)

REMARKS

This Preliminary Amendment is being made upon entry of International Application No. PCT/US03/28654 into the U.S. National Phase of prosecution. In the specification, a new paragraph has been added to the first line of the specification to include the priority information. An Abstract on a separate sheet is attached as required under 37 CFR 1.72(b). Claims 16-17, 20-40, and 43-46 have been cancelled. The Applicants reserve the right to prosecute, in one or more patent applications, the claims as originally filed and/or any other claims supported by the specification. Entry of this amendment into the record is requested.

Respectfully submitted,



Jason C. Fedon
Agent for Applicants
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ABSTRACT OF THE DISCLOSURE

A method of modulating viral RNA replication and translation, in a eukaryotic cell, of positive-strand viral RNA, comprising the step of contacting a viral RNA-binding protein (vRbp) with a compound that modulates an activity of said protein.

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SEQUENCE LISTING

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Isken, Olaf
Grassmann, Claus W.
Sarisky, Robert T.

<120> A Set Of Ubiquitous Cellular Proteins
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Gln Ile Pro Arg Glu Glu Gln Arg Lys Val Phe Asp Pro Val Pro Val
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Gly Val Thr Lys Val Ile Leu Ser Thr Asn Ile Ala Glu Thr Ser Ile
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Thr Ile Asn Asp Val Val Tyr Val Ile Asp Ser Cys Lys Gln Lys Val
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Lys Leu Phe Thr Ala His Asn Asn Met Thr Asn Tyr Ser Thr Val Trp
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Thr Ala Gly Phe Cys Phe His Leu Cys Ser Arg Ala Arg Phe Glu Arg
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Leu Glu Thr His Met Thr Pro Glu Met Phe Arg Thr Pro Leu His Glu
785                 790                 795                 800
Ile Ala Leu Ser Ile Lys Leu Leu Arg Leu Gly Gly Ile Gly Gln Phe
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Leu Ala Lys Ala Ile Glu Pro Pro Pro Leu Asp Ala Val Ile Glu Ala
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Gly Lys Met Met Ile Met Gly Cys Ile Phe Tyr Val Gly Asp Ala Ile
865 870 875 880
Cys Thr Ile Ala Ala Ala Thr Cys Phe Pro Glu Pro Phe Ile Asn Glu
885 890 895
Gly Lys Arg Leu Gly Tyr Ile His Arg Asn Phe Ala Gly Asn Arg Phe
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Ser Asp His Val Ala Leu Leu Ser Val Phe Gln Ala Trp Asp Asp Ala
915 920 925
Arg Met Gly Gly Glu Glu Ala Glu Ile Arg Phe Cys Glu His Lys Arg
930 935 940
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945 950 955 960
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Gln Val Phe Thr Asn Thr Gly Pro Asp Asn Asn Leu Asp Val Val Ile
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<213> Home sapien

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<211> 894
<212> PRT
<213> Homo sapien

<400> 3

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35 40 45
Ile Asp Glu Gln Glu Lys Gly Ser Ser Glu Gln Ala Glu Ser Asp Asn
50 55 60
Met Asp Val Pro Pro Glu Asp Asp Ser Lys Glu Gly Ala Gly Glu Gln
65 70 75 80
Lys Thr Glu His Met Thr Arg Thr Leu Arg Gly Val Met Arg Val Gly
85 90 95
Leu Val Ala Lys Cys Leu Leu Leu Lys Gly Asp Leu Asp Leu Glu Leu
100 105 110
Val Leu Leu Cys Lys Glu Lys Pro Thr Thr Ala Leu Leu Asp Lys Val
115 120 125
Ala Asp Asn Leu Ala Ile Gln Leu Ala Ala Val Thr Glu Asp Lys Tyr
130 135 140
Glu Ile Leu Gln Ser Val Asp Asp Ala Ala Ile Val Ile Lys Asn Thr
145 150 155 160
Lys Glu Pro Pro Leu Ser Leu Thr Ile His Leu Thr Ser Pro Val Val
165 170 175
Arg Glu Glu Met Glu Lys Val Leu Ala Gly Glu Thr Leu Ser Val Asn
180 185 190
Asp Pro Pro Asp Val Leu Asp Arg Gln Lys Cys Leu Ala Ala Leu Ala
195 200 205
Ser Leu Arg His Ala Lys Trp Phe Gln Ala Arg Ala Asn Gly Leu Lys
210 215 220
Ser Cys Val Ile Val Ile Arg Val Leu Arg Asp Leu Cys Thr Arg Val
225 230 235 240
Pro Thr Trp Gly Pro Leu Arg Gly Trp Pro Leu Glu Leu Leu Cys Glu
245 250 255
Lys Ser Ile Gly Thr Ala Asn Arg Pro Met Gly Ala Gly Glu Ala Leu
260 265 270
Arg Arg Val Leu Glu Cys Leu Ala Ser Gly Ile Val Met Pro Asp Gly
275 280 285
Ser Gly Ile Tyr Asp Pro Cys Glu Lys Glu Ala Thr Asp Ala Ile Gly
290 295 300
His Leu Asp Arg Gln Gln Arg Glu Asp Ile Thr Gln Ser Ala Gln His
305 310 315 320
Ala Leu Arg Leu Ala Ala Phe Gly Gln Leu His Lys Val Leu Gly Met
325 330 335
Asp Pro Leu Pro Ser Lys Met Pro Lys Lys Pro Lys Asn Glu Asn Pro
340 345 350
Val Asp Tyr Thr Val Gln Ile Pro Pro Ser Thr Thr Tyr Ala Ile Thr
355 360 365
Pro Met Lys Arg Pro Met Glu Glu Asp Gly Glu Glu Lys Ser Pro Ser
370 375 380
Lys Lys Lys Lys Lys Ile Gln Lys Lys Glu Glu Lys Ala Glu Pro Pro
385 390 395 400
Gln Ala Met Asn Ala Leu Met Arg Leu Asn Gln Leu Lys Pro Gly Leu
405 410 415
Gln Tyr Lys Leu Val Ser Gln Thr Gly Pro Val His Ala Pro Ile Phe
420 425 430
Thr Met Ser Val Glu Val Asp Gly Asn Ser Phe Glu Ala Ser Gly Pro
435 440 445
Ser Lys Lys Thr Ala Lys Leu His Val Ala Val Lys Val Leu Gln Asp
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Met Gly Leu Pro Thr Gly Ala Glu Gly Arg Asp Ser Ser Lys Gly Glu
465 470 475 480
Asp Ser Ala Glu Glu Thr Glu Ala Lys Pro Ala Val Val Ala Pro Ala
485 490 495
Pro Val Val Glu Ala Val Ser Thr Pro Ser Ala Ala Phe Pro Ser Asp
500 505 510
Ala Thr Ala Glu Gln Gly Pro Ile Leu Thr Lys His Gly Lys Asn Pro
515 520 525
Val Met Glu Leu Asn Glu Lys Arg Arg Gly Leu Lys Tyr Glu Leu Ile
530 535 540

Ser Glu Thr Gly Gly Ser His Asp Lys Arg Phe Val Met Glu Val Glu
545 550 555 560
Val Asp Gly Gln Lys Phe Gln Gly Ala Gly Ser Asn Lys Lys Val Ala
565 570 575
Lys Ala Tyr Ala Ala Leu Ala Ala Leu Glu Lys Leu Phe Pro Asp Thr
580 585 590
Pro Leu Ala Leu Asp Ala Asn Lys Lys Lys Arg Ala Pro Val Pro Val
595 600 605
Arg Gly Gly Pro Lys Phe Ala Ala Lys Pro His Asn Pro Gly Phe Gly
610 615 620
Met Gly Gly Pro Met His Asn Glu Val Pro Pro Pro Pro Asn Leu Arg
625 630 635 640
Gly Arg Gly Arg Gly Gly Ser Ile Arg Gly Arg Gly Arg Gly Arg Gly
645 650 655
Phe Gly Gly Ala Asn His Gly Gly Tyr Met Asn Ala Gly Ala Gly Tyr
660 665 670
Gly Ser Tyr Gly Tyr Gly Gly Asn Ser Ala Thr Ala Gly Tyr Ser Gln
675 680 685
Phe Tyr Ser Asn Gly Gly His Ser Gly Asn Ala Ser Gly Gly Gly Gly
690 695 700
Gly Gly Gly Gly Gly Ser Ser Gly Tyr Gly Ser Tyr Tyr Gln Gly Asp
705 710 715 720
Asn Tyr Asn Ser Pro Val Pro Pro Lys His Ala Gly Lys Lys Gln Pro
725 730 735
His Gly Gly Gln Gln Lys Pro Ser Tyr Gly Ser Gly Tyr Gln Ser His
740 745 750
Gln Gly Gln Gln Gln Ser Tyr Asn Gln Ser Pro Tyr Ser Asn Tyr Gly
755 760 765
Pro Pro Gln Gly Lys Gln Lys Gly Tyr Asn His Gly Gln Gly Ser Tyr
770 775 780
Ser Tyr Ser Asn Ser Tyr Asn Ser Pro Gly Gly Gly Gly Gly Ser Asp
785 790 795 800
Tyr Asn Tyr Glu Ser Lys Phe Asn Tyr Ser Gly Ser Gly Gly Arg Ser
805 810 815
Gly Gly Asn Ser Tyr Gly Ser Gly Gly Ala Ser Tyr Asn Pro Gly Ser
820 825 830
His Gly Gly Tyr Gly Gly Gly Ser Gly Gly Gly Ser Ser Tyr Gln Gly
835 840 845
Lys Gln Gly Gly Tyr Ser Gln Ser Asn Tyr Asn Ser Pro Gly Ser Gly
850 855 860
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<211> 2685
<212> DNA
<213> Homo sapien

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<211> 702
<212> PRT
<213> Homo sapien

<400> 5

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Asn Met Val Ser His Thr Glu Arg Ala Leu Lys Ala Val Ser Asp Trp
        35                  40                  45
Ile Asp Glu Gln Glu Lys Gly Ser Ser Glu Gln Ala Glu Ser Asp Asn
    50                  55                  60
Met Asp Val Pro Pro Glu Asp Asp Ser Lys Glu Gly Ala Gly Glu Gln
65                  70                  75                  80
Lys Thr Glu His Met Thr Arg Thr Leu Arg Gly Val Met Arg Val Gly
                85                  90                  95
Leu Val Ala Lys Cys Leu Leu Leu Lys Gly Asp Leu Asp Leu Glu Leu
            100                 105                 110
Val Leu Leu Cys Lys Glu Lys Pro Thr Thr Ala Leu Leu Asp Lys Val
        115                 120                 125
Ala Asp Asn Leu Ala Ile Gln Leu Ala Ala Val Thr Glu Asp Lys Tyr
    130                 135                 140
Glu Ile Leu Gln Ser Val Asp Asp Ala Ala Ile Val Ile Lys Asn Thr
145                 150                 155                 160
Lys Glu Pro Pro Leu Ser Leu Thr Ile His Leu Thr Ser Pro Val Val
                165                 170                 175
Arg Glu Glu Met Glu Lys Val Leu Ala Gly Glu Thr Leu Ser Val Asn
            180                 185                 190
Asp Pro Pro Asp Val Leu Asp Arg Gln Lys Cys Leu Ala Ala Leu Ala
        195                 200                 205
Ser Leu Arg His Ala Lys Trp Phe Gln Ala Arg Ala Asn Gly Leu Lys
    210                 215                 220
Ser Cys Val Ile Val Ile Arg Val Leu Arg Asp Leu Cys Thr Arg Val
225                 230                 235                 240
Pro Thr Trp Gly Pro Leu Arg Gly Trp Pro Leu Glu Leu Leu Cys Glu
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Lys Ser Ile Gly Thr Ala Asn Arg Pro Met Gly Ala Gly Glu Ala Leu
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275 280 285
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290 295 300
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305 310 315 320
Ala Leu Arg Leu Ala Ala Phe Gly Gln Leu His Lys Val Leu Gly Met
325 330 335
Asp Pro Leu Pro Ser Lys Met Pro Lys Lys Pro Lys Asn Glu Asn Pro
340 345 350
Val Asp Tyr Thr Val Gln Ile Pro Pro Ser Thr Thr Tyr Ala Ile Thr
355 360 365
Pro Met Lys Arg Pro Met Glu Glu Asp Gly Glu Glu Lys Ser Pro Ser
370 375 380
Lys Lys Lys Lys Lys Ile Gln Lys Lys Glu Glu Lys Ala Glu Pro Pro
385 390 395 400
Gln Ala Met Asn Ala Leu Met Arg Leu Asn Gln Leu Lys Pro Gly Leu
405 410 415
Gln Tyr Lys Leu Val Ser Gln Thr Gly Pro Val His Ala Pro Ile Phe
420 425 430
Thr Met Ser Val Glu Val Asp Gly Asn Ser Phe Glu Ala Ser Gly Pro
435 440 445
Ser Lys Lys Thr Ala Lys Leu His Val Ala Val Lys Val Leu Gln Asp
450 455 460
Met Gly Leu Pro Thr Gly Ala Glu Gly Arg Asp Ser Ser Lys Gly Glu
465 470 475 480
Asp Ser Ala Glu Glu Thr Glu Ala Lys Pro Ala Val Val Ala Pro Ala
485 490 495
Pro Val Val Glu Ala Val Ser Thr Pro Ser Ala Ala Phe Pro Ser Asp
500 505 510
Ala Thr Ala Glu Gln Gly Pro Ile Leu Thr Lys His Gly Lys Asn Pro
515 520 525
Val Met Glu Leu Asn Glu Lys Arg Arg Gly Leu Lys Tyr Glu Leu Ile
530 535 540
Ser Glu Thr Gly Gly Ser His Asp Lys Arg Phe Val Met Glu Val Glu
545 550 555 560
Val Asp Gly Gln Lys Phe Gln Gly Ala Gly Ser Asn Lys Lys Val Ala
565 570 575
Lys Ala Tyr Ala Ala Leu Ala Ala Leu Glu Lys Leu Phe Pro Asp Thr
580 585 590
Pro Leu Ala Leu Asp Ala Asn Lys Lys Lys Arg Ala Pro Val Pro Val
595 600 605
Arg Gly Gly Pro Lys Phe Ala Ala Lys Pro His Asn Pro Gly Phe Gly
610 615 620
Met Gly Gly Pro Met His Asn Glu Val Pro Pro Pro Pro Asn Leu Arg
625 630 635 640
Gly Arg Gly Arg Gly Gly Ser Ile Arg Gly Arg Gly Arg Gly Arg Gly
645 650 655
Phe Gly Gly Ala Asn His Gly Gly Tyr Met Asn Ala Gly Ala Gly Tyr
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675 680 685
Phe Phe Thr Asp Cys Tyr Gly Tyr His Asp Phe Gly Ser Ser
690 695 700

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<211> 2107
<212> DNA
<213> Homo sapien

<400> 6
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